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EXAMINER

HU, RUI MENG

ART UNIT	PAPER NUMBER
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2618

DATE MAILED: 10/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/516,318

Applicant(s)

ARGAMAN ET AL.

Examiner

RuiMeng Hu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 10/19/2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Preliminary Amendment***

1. The present Office Action is based upon the original patent application filed on 12/13/2004 as modified by the preliminary amendment filed on 12/13/2004. **Claims 1-40** are now pending in the present application.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 10/19/2005 has been considered by the examiner and made of record in the application file.

### ***Drawings***

3. The drawings are objected to because of the following informalities:

(a). **Figures 3, 4, 5 and 7** are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "35" has been used to designate multiple different features in figures 3, 4, 5 and 7.

(b). **Figure 10** is objected to as failing to comply with 37 CFR 1.84(p)(5) because figure 10 does not include the following reference sign mentioned in the description: "100".

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-2, 4-18, 21-23 and 26-38** are rejected under 35 U.S.C. 102(e) as being anticipated by **Shapira et al. (US Patent # 6987990)**.

The applied reference has a common assignee with the instant application.

Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Consider **claim 1**, Shapira et al. clearly disclose upgrading apparatus for obtaining a transmit diversity signal for transmission alongside a main R.F. signal using at least one antenna, the apparatus comprising (column 2 lines 5-25): an R.F. operable signal extractor for extracting a sample of said R.F. main signal (figure 1, coupler 40), and an R.F. operable diversity unit (figure 1, coupler 40 and delay unit 35) for transforming said R.F. sample signal thereby to form said transmit diversity signal (column 5 lines 30-40), said apparatus being configured for insertion between at least one R.F. output (figure 1, main antenna array 10a) of an existing cellular base station (figure 1, base station 200a) and a passive diversity antenna (figure 1, secondary antenna array 30a), said main R.F. signal being obtained from said R.F. output (figure 1, main antenna array 10a), thereby to confer upon said existing cellular base station a transmit diversity capability (column 3 line 66-column 4 line 8).

Consider **claim 2, as applied to claim 1 above**, Shapira et al. clearly disclose said existing base station comprises a single R.F. output for transmit signals and at least two R.F. inputs for receive signals (figure 1, Tx-Rx and Rx).

Consider **claim 4, as applied to claim 1 above**, Shapira et al. clearly disclose a R.F. signal is a low power R.F. signal (before being amplified by LPA 60 or LNA 70) and said apparatus further comprises amplification circuitry for amplifying said main and said diversity signals (figure 1, LPA 60 and LNA 70).

Consider **claim 5, as applied to claim 1 above**, Shapira et al. clearly disclose a R.F. signal is a high power R.F. signal (after being amplified by LPA 60 or LNA 70).

Consider **claim 6, as applied to claim 1 above**, Shapira et al. clearly disclose said base station comprises two receive/transmit subsystems, each for transmitting and receiving separate channels (figure 1, Tx-Rx 10a and active antenna array 30a, column 3 lines 59-65).

Consider **claim 7, as applied to claim 6 above**, Shapira et al. clearly disclose said passive diversity antenna is for adding to said base station as part of said upgrading (column 2 lines 5-25).

Consider **claim 8, as applied to claim 6 above**, Shapira et al. clearly disclose said apparatus comprises two co-located antennas for substituting with said at least one antenna (antenna array 10a and antenna array 30a).

Consider **claim 9, as applied to claim 6 above**, Shapira et al. clearly disclose said apparatus comprises two co-located antenna parts for substituting with said at least

one antenna wherein said antenna parts form at least one of a group comprising a two-column antenna and a dual polarized antenna (figure 2, Tx / DUAL-POL Rx).

Consider **claim 10, as applied to claim 1 above**, Shapira et al. clearly disclose said passive diversity antenna comprises at least two antenna elements, thereby to provide receive space diversity capability (figure 1, elements 5a).

Consider **claim 11, as applied to claim 1 above**, Shapira et al. clearly disclose said cellular base station comprises a CDMA air interface, and wherein said main signal and said diversity signal comprise multiple CDMA carriers (column 1 lines 56-63, column 2 line 62-column 3 line 2).

Consider **claim 12, as applied to claim 6 above**, Shapira et al. clearly disclose said signal extractor is located in proximity to said R.F. output (figure 1, column 4 lines 13-16).

Consider **claim 13, as applied to claim 6 above**, Shapira et al. clearly disclose said signal extractor is located within a housing configured for connection in proximity to said base station (figures 1 and 8, column 4 lines 13-16).

Consider **claim 14, as applied to claim 6 above**, Shapira et al. clearly disclose said R.F. signal is a low power R.F. signal (before being amplified by LPA 60 or LNA 70 or PA 85), said apparatus further comprises amplification circuitry for amplifying said main and said diversity signals, and said amplification circuitry is located in proximity to the respective antennas (figure 1, PA 85, active radiator unit 5a, LPA 60 and LNA 70).

Consider **claim 15, as applied to claim 14 above**, Shapira et al. clearly disclose said amplification circuitry is located within a housing unit configured for connection in

proximity to said passive antenna (figure 1, PA 85, active radiator unit 5a, LPA 60 and LNA 70, column 4 lines 13-16).

Consider **claim 16, as applied to claim 15 above**, Shapira et al. clearly disclose said housing unit is a modular unit comprising a first module for a main signal path and a second module for a diversity signal path (figure 8).

Consider **claim 17, as applied to claim 6 above**, Shapira et al. clearly disclose said cellular base station comprises a plurality of outputs and said signal extractor (figure 1, coupler 40 and delay unit 35) comprises a signal combiner, said sample comprising a combination of signals from said outputs (figures 1-4, column 2 line 62-column 3 line 2, column 3 lines 22-34, in multiple-carrier CDMA application, signal combiners may be required, thus a combination of signals may be obtained).

Consider **claim 18, as applied to claim 6 above**, Shapira et al. clearly disclose said signal extractor comprises at least one directional coupler (figure 1, coupler 40).

Consider **claim 21, as applied to claim 1 above**, Shapira et al. clearly disclose an R.F. operable duplexer for providing a dual transmit-receive capability to an antenna, said duplexer being for connection to an existing antenna configured for receiving, to enable said existing antenna to transmit said transmit diversity signal (figures 1-4, diplexer 15b, antenna array 30a capable of transmitting and receiving diverse signals).

Consider **claim 22, as applied to claim 1 above**, Shapira et al. clearly disclose existing base station is a multiple air interface base station having a CDMA air interface and at least one other air interface and in which said at least one R.F. output is a low power R.F. output, said apparatus configured to extract a CDMA signal for feeding to

said R.F. operable diversity unit whilst leaving signals of said at least one other air interface unchanged (column 2 lines 35-61).

Consider **claim 23, as applied to claim 22 above**, Shapira et al. clearly disclose amplification (figures 1-4, PA 85, LPA 60 and LNA 70).

Consider **claim 26**, Shapira et al. clearly disclose a method of enhancing a base station having a CDMA air interface with receive space diversity capability so as to provide said base station with transmit diversity capability (column 2 lines 6-13), the method comprising: attaching a radio frequency interface unit (figure 1, coupler 40 and delay unit 35) to an R.F. output of said base station to obtain a sample of a main R.F. signal (column 5 lines 30-40), attaching a diversity unit (figure 1, coupler 40 and delay unit 35) to said radio frequency interface unit to generate a transmit diversity signal (figure 2, Tx2), and connecting said diversity unit to a diversity antenna (column 4 lines 55-56, figure 1, antenna array 10a or 30a) of said base station to transmit said transmit diversity signal (figures 1-4, column 2 line 35-column 3 line 2, column 3 line 66-column 4 line 8).

Consider **claim 27, as applied to claim 26 above**, Shapira et al. clearly disclose said base station comprises a passive antenna array (figure 1, antenna array 10a or 30a).

Consider **claim 28, as applied to claim 26 above**, Shapira et al. clearly disclose said base station comprises two transmit/receive subsystems, each for sending and receiving distinct channels (figures 1-4, column 2 line 62-column 3 line 2).



Consider **claim 29, as applied to claim 28 above**, Shapira et al. clearly disclose adding a further passive antenna to said base station to provide a transmit diversity antenna (figure 1, antenna 30a).

Consider **claim 30, as applied to claim 28 above**, Shapira et al. clearly disclose replacing at least one existing antenna with two co-located antennas (figures 1-4, antenna arrays 10a and 30a).

Consider **claim 31, as applied to claim 30 above**, Shapira et al. clearly disclose said co-located antennas comprise one of a group comprising a commonly polarized antenna arrangement and a dual polarized antenna arrangement (figure 2, Tx/DUAL-POL Rx).

Consider **claim 32, as applied to claim 26 above**, Shapira et al. clearly disclose said antenna arrangement comprises at least two spaced antennas to provide receive space diversity capability, the method further comprising attaching a duplexer (duplexer 15b) to a receive diversity antenna of said antenna arrangement to provide said receive diversity antenna with transmit-receive capability, thereby to transmit said transmit diversity signal therefrom (figures 1-4, duplexer 15b, column 2 line 62-column 3 line 2).

Consider **claim 33, as applied to claim 26 above**, Shapira et al. clearly disclose said R.F. output is a low power output and wherein said method further comprises adding power amplification (figures 1-4, PA 85, LPA 60 and LNA 70).

Consider **claim 34, as applied to claim 33 above**, Shapira et al. clearly disclose providing said power amplification in close proximity to said antenna (figure 1, 5a).

Consider **claim 35, as applied to claim 34 above**, Shapira et al. clearly disclose providing said power amplification in two modules, one for a main signal path and one for a diversity signal path (figure 8, LNA).

Consider **claim 36, as applied to claim 26 above**, Shapira et al. clearly disclose providing at least one directional coupler in said radio frequency interface unit for obtaining said sample signal (coupler 40).

Consider **claim 37, as applied to claim 26 above**, Shapira et al. clearly disclose said base station is a multiple air interface base station in which one air interface is CDMA, wherein said R.F. output is a low power output and said connecting said diversity unit comprising setting up a path from said R.F. output to extract a CDMA signal and not to extract other signals (column 2 lines 35-61).

Consider **claim 38, as applied to claim 26 above**, Shapira et al. clearly disclose said base station comprises one R.F. transmit output and two R.F. receive inputs (figure 1, Tx-Rx and Rx).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Shapira et al. (US Patent # 6987990)** in view of **Scherzer (US Patent # 7079809)**.

Consider **claim 3, as applied to claim 2 above**, Shapira et al. clearly disclose said apparatus further comprising amplification (figure 1, PA 85, LPA 60 and LNA 70).

However Shapira et al. fail to specifically disclose said single R.F. output is a low power output.

In the same field of endeavor, Scherzer clearly discloses a low RF power output is desired (column 1 lines 31-47).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by

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Scherzer into the art of Shapira et al. as having a low RF power output for reducing interference in the same coverage area.

10. **Claims 19 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shapira et al. (US Patent # 6987990)** in view of **Takahashi (US Patent # 6396821)**.

Consider **claims 19 and 20, as applied to claim 6 above**, Shapira et al. clearly disclose said base station comprises a plurality of R.F. outputs (figure 1, Tx-Rx 10a and Tx-Rx 30a) and said signal extractor comprises a coupler 40 as for adapting CDMA application (column 2 line 62-column 3 line 2, column 3 lines 22-34).

However Shapira et al. fail to specifically disclose said signal extractor comprises a plurality of directional couplers and a signal combiner as for adapting multiple-carrier CDMA.

In the same field of endeavor, Takahashi et al. clearly disclose transmission synthesis circuits 81-84 (signal combiners), and transmission units 61-66 for adapting multiple-carrier CDMA as to transmit groups of carriers over diverse antennas (figure 1, Abstract).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Takahashi et al. into the art of Shapira et al. as to include a plurality of directional couplers as for adapting multiple-carrier CDMA and transmit multiple carriers signals over diverse antennas for reducing signal distortion.

11. **Claims 24-25 and 39-40** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Shapira et al. (US Patent # 6987990)** in view of **Smith (US Patent # 6094165)**.

Consider **claim 24 as applied to claim 1 above** and **claim 39 as applied to claim 26 above**, Shapira et al. fail to disclose providing antenna control for azimuthal beam squint and azimuthal beamwidth shaping.

In the same field of endeavor, Smith clearly discloses providing antenna control for azimuthal beam squint and azimuthal beamwidth shaping (column 11 lines 48-65).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Smith into the art of Shapira et al. for utilizing space diversity to increase signal quality.

Consider **claim 25 as applied to claim 24 above** and **claim 40 as applied to claim 39 above**, Shapira et al. fail to disclose said antenna control comprises circuitry for adjusting a main lobe tilt.

In the same field of endeavor, Smith clearly discloses antenna control comprises circuitry for adjusting a main lobe tilt (column 11 lines 48-65).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the selection technique taught by Smith into the art of Shapira et al. for utilizing space diversity to increase signal quality.

### ***Conclusion***

12. Any response to this Office Action should be **faxed to (571) 273-8300 or mailed**

to: Commissioner for Patents  
P.O. Box 1450  
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**Hand-delivered responses** should be brought to

Customer Service Window  
Randolph Building  
401 Dulany Street  
Alexandria, VA 22314

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RuiMeng Hu whose telephone number is 571-270-1105. The examiner can normally be reached on Monday - Thursday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on 571-272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RuiMeng Hu  
R.H./rh  
October 19, 2006

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PATENT EXAMINER/TELECOMM.

*Edan Orgad 10/13/06*